**EPA Comments on the Draft Plutonium in Soils Treatability Studies Work Plans TRUclean and Magnetic Separation**

**General Comments**

Overall, EPA is unable to evaluate whether these treatability studies will be performed adequately and whether the objectives will be met. There are two main reasons for this. First, the work plans suffer from a lack of specific test plans to optimize each piece of equipment utilized for each technology. Second, the work plans fail to specify how the optimization will be performed and whether real time monitoring with a gamma detector will be used for monitoring system performance or if the samples are going to be sent to a laboratory. EPA recommends that the samples be sent to a laboratory. Real time monitoring may not provide data of sufficient quality to optimize performance, especially when working with low concentrations of radionuclides. These general comments apply equally for both the TRUclean and Magnetic Separation studies. More specific comments on the TRUclean process are included below.

**Specific Comments**

Section 4.1, Level of Work Plan Development, page 6. The text mentions that the TRUclean Process tests will require approximately 1450 kilograms of bulk soil sample. How was this amount calculated? 10 to 15 process equipment tests using 22 to 23 kilograms each, plus 4 to 5 record runs using 90 to 91 kilograms each, constitute 600 to 800 kilograms total. This needs to be explained.

In addition, it is not clear if a bulk soil sample will be used for each run or the same soil sample will be used for all the runs needed for the optimization of a particular piece of equipment. The best method for optimization of a particular equipment is to use a bulk soil sample each time. In this manner, one can evaluate the effects of each manipulated parameter on the performance of the equipment.

Section 5.2.2, Data Types, page 11. The text states that the bulk soil sample is going to be analyzed for chemical and radiological parameters. The intent of these treatability studies is to determine whether these technologies are capable of removing radionuclides from soils with plutonium as a critical parameter. This section needs to explain the need for analyzing chemical parameters.

Section 7.2, Technology Description, page 20. The text states that separation is accomplished by the different settling rates of the particles in a vertical pulse of water. The settling velocity of plutonium in water needs to be calculated. Special care should be taken to ensure that plutonium settling velocity is greater than the velocity of the upflow water in order for

plutonium particles to settle.

The text mentions that hydrocyclones are optional and will be used if improvement is needed in effecting particle size cuts. Hydrocyclones may have the potential to remove plutonium from soils. EPA recommends evaluating their capabilities of removing radionuclides from soils.

Section 7.3.1, Experimental Design, page 25. The text states that a 22 to 23 kilogram sample of contaminated soils will be charged 10 to 15 times to a piece of equipment to determine the optimum operating parameters for a particular unit operation. Is the same soil sample going to be passed through one particular unit 10 to 15 times? This needs to be explained.

In order to better understand and determine the effects of each manipulated parameter on a particular piece of equipment, one needs to use a new bulk soil sample each time. EPA recommends including a specific test plan detailing the test runs for each piece of equipment. This specific test plan should specify the number of bulk soil samples to be tested for each unit, the manipulated parameters, the different setting values for each parameter, and how they are going to be studied. If during the test runs it is encountered that the chosen values for each parameter do not represent the best operating conditions, then a new set of values should be selected and studied. Special care should be taken to statistically design the test plan.

How was it determined that 90 to 91 kilograms would be needed during the phase II runs? This needs to be explained in detail.

Figure 7.3-3. This figure shows that the next step after the trommel is to pass the soils through the spiral classifier. This is not in agreement with figure 7.2-3 which shows the spiral classifier as a polishing step after the gravity separator unit. In addition, paragraph four on page 20 states that the spiral classifier may be used as a polishing step. This figure needs to be consistent with the overall TRUclean process diagram (figure 7.2-3).

Figure 7.6-1. This figure shows an anticipated soil material balance. What about a water material balance? The TRUclean process will require large quantities of water for its performance. The water used will be contaminated and may be consider hazardous or radioactive waste. Therefore, it is important to calculate the amounts of contaminated water to be generated which may require further treatment.

Figure 7.9-1. This schedule needs to be updated.